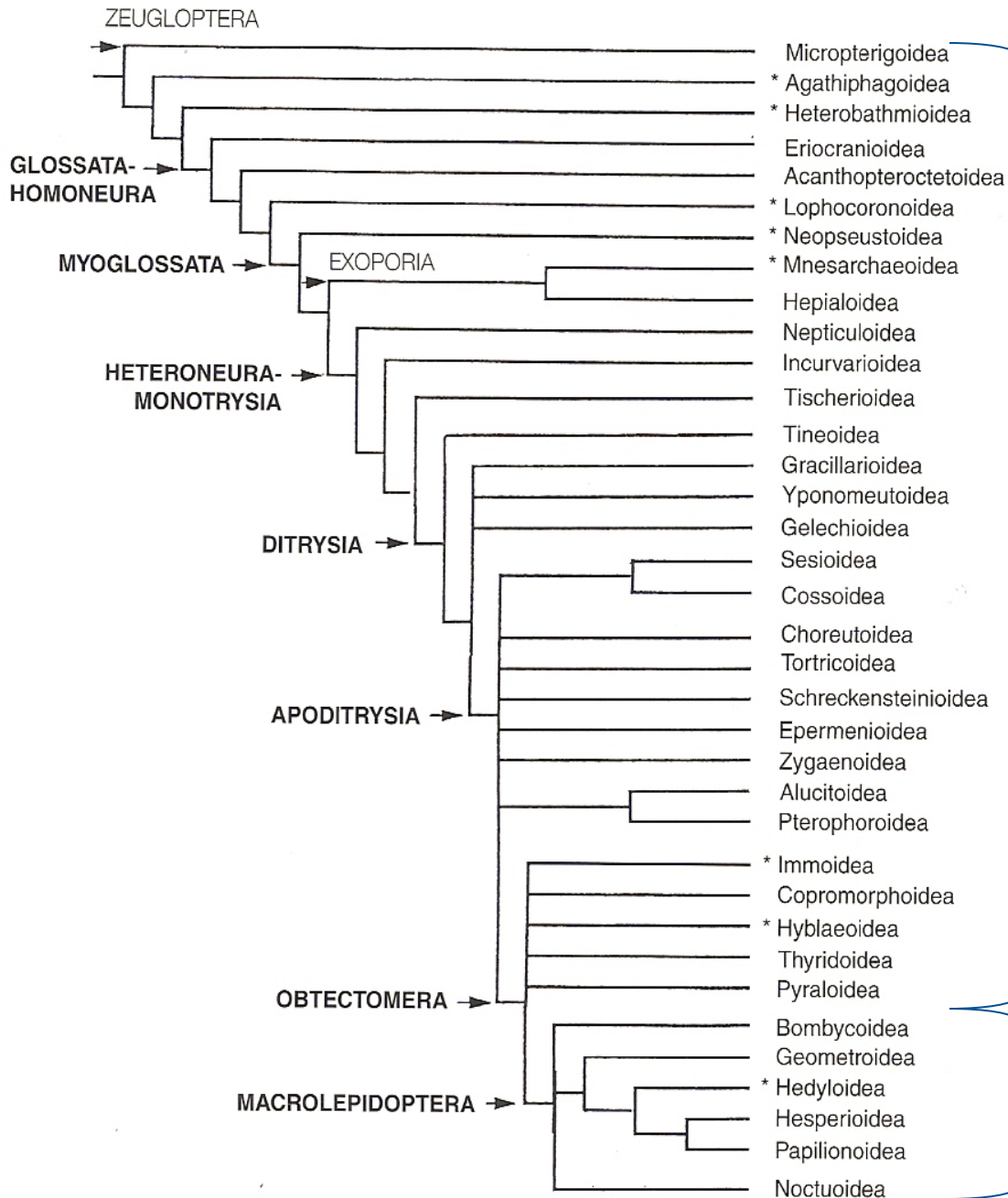


# Brief (and Superficial) Overview of Macrolepidoptera Classification and Diversity (big moths? Ugh!)





Microlepidoptera and Pyraloidea  
35% of the species diversity  
75% of the family diversity

Macrolepidoptera  
(Macroheterocera)  
65% of the species diversity  
25% of the family diversity



# Macroheterocera

- Drepanoidea (672 species)
- Lasiocampoidea (1,952 species)
- Bombycoidea (4,723 species)
- Geometroidea (23,748 species)
- Noctuoidea (42,407 species)



# Drepanoidea

- Drepanidae – 122 genera, 660 species
- Cimeliidae – 2 genera, 6 species
- Doidae – 2 genera, 6 species



Drepanidae



Cimeliidae



Doidae

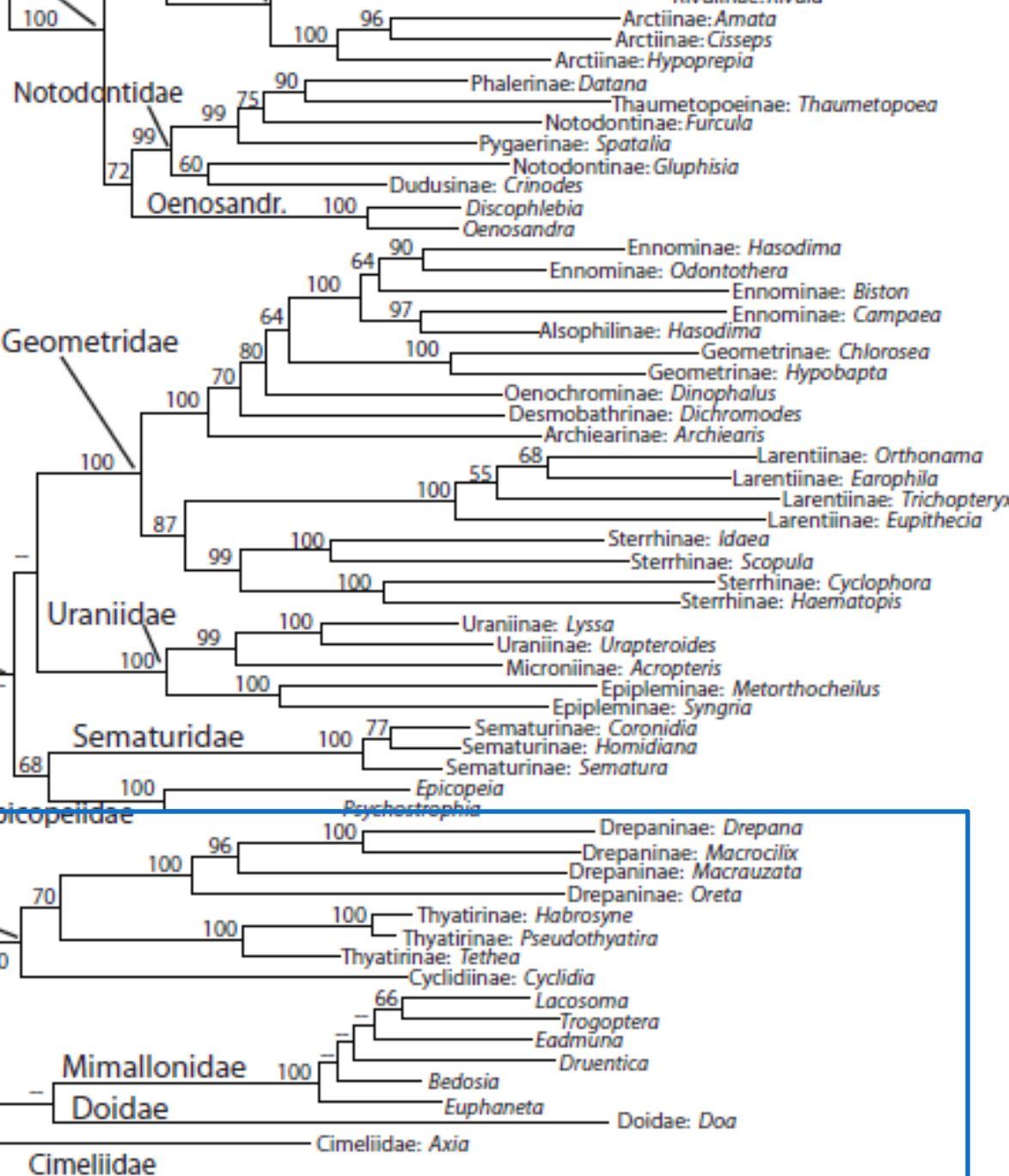


# Drepanoidea

Macroheterocera

Geometroidea

Drepanidae





# Drepanoidea

- Drepanidae – 122 genera, 660 species

HOOKTIP MOTHS



rose hooktip moth  
*Oreta rosea*



© 2007 Tim den Hartog



rose hooktip moth  
*Oreta rosea*



# Drepanoidea

- Drepanidae – 122 genera, 660 species

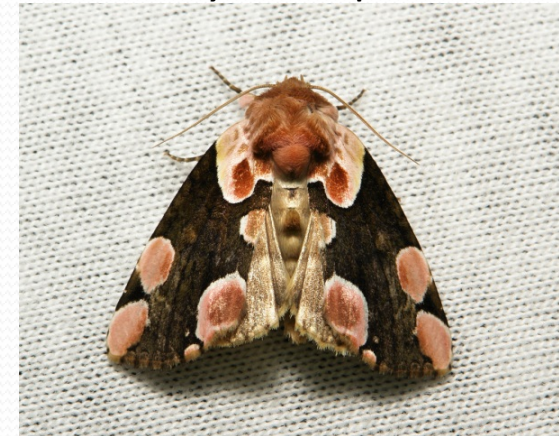
HOOKTIP MOTHS



Thyatirinae  
*Habrosyne scripta*



Thyatirinae  
*Thyatira* sp.



© Barb Sendelbach 2012



# Drepanoidea



Cimeliidae (2 genera, 6 species)  
southern Europe  
on Euphorbiaceae



Doidae (2 genera, 6 species)  
western North America  
on Euphorbiaceae



# Lasiocampoidea

- Lasiocampidae (224 genera, 1,952 species)

## TENT CATERpillARS

Variable in size, frequently sexually dimorphic.

Mostly nocturnal.

Triangular forewing, usually with rounded margin.

Short antennae, usually plumose in male.

Haustellum either reduced or absent.

Head somewhat small or concealed.



*Gloveria arizonensis*



*Dicogaster coronada*

© John Rapp



*Malacosoma* sp.

# Bombycoidea

- Apatelodidae (10 genera, 145 species)
- Eupterotidae (53 genera, 339 species)
- Brahmaeidae (7 genera, 65 species)
- Phiditiidae (4 genera, 23 species)
- Anthelidae (9 genera, 94 species)
- Carthaeidae (1 genera, 1 species)
- Endromidae (12 genera, 59 species)
- Bombycidae (26 genera, 185 species)
- Saturniidae (169 genera, 2,349 species)
- Sphingidae (206 genera, 1,463 species)



*Bombyx mori*



*Brahmaeidae*



*Anthelidae*



# Bombycoidea

- Apatelodidae (10 genera, 145 species)\*
- Eupterotidae (53 genera, 339 species)
- Brahmaeidae (7 genera, 65 species)
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# Bombycoidea - Apatelodidae

## AMERICAN SILK MOTHS, APATELODID MOTHS

Medium-sized (wingspan 3.2-4.2 cm), nocturnal.

Characteristic wing shape and pattern.

Antennae short.

Haustellum reduced.

Larvae densely hairy and feed externally.

*Apatelodes  
torrefacta*



# Bombycoidea - Sphingidae



HAWK MOTHS, HORN WORMS, HUMMINGBIRD MOTHS

Large, mostly nocturnal (a few diurnal).

Long, narrow forewing.

Antennae thick, sometimes swollen distally.

Long haustellum, head pronounced.





# Bombycoidea - Sphingidae



HAWK MOTHS, HORN WORMS, HUMMINGBIRD MOTHS

Larvae usually with distinctive caudal horn.

Pupa usually with long, free hausellum.

Pests of tomatoes, potatoes, tobacco (Solanaceae),  
sweet potato (Convolvulaceae).





# Bombycoidea - Sphingidae



# Bombycoidea - Sphingidae



HAWK MOTHS, HORN WORMS, HUMMINGBIRD MOTHS



*Hyles lineata*



*Manduca rustica*



*Eumorpha typhon*



# Bombycoidea - Saturniidae



## GIANT SILK MOTHS

Large nocturnal moths (a few diurnal).

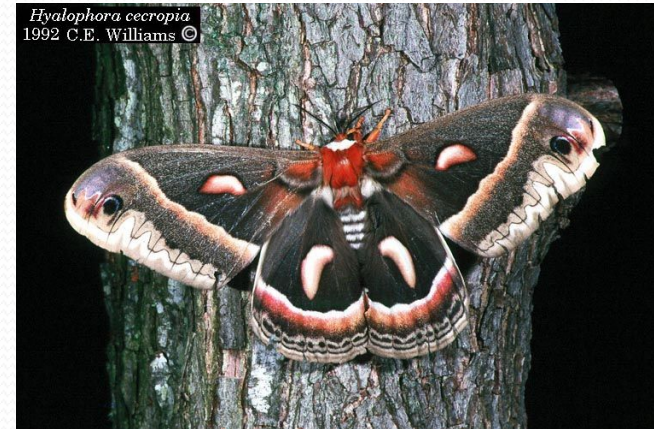
Broad, triangular forewing (lacking a frenulum).

Many species with “eyespot” on hindwing.

Short antennae, usually plumose in male.

Haustellum either reduced or absent

Head rather small, somewhat concealed.





# Bombycoidea - Saturniidae

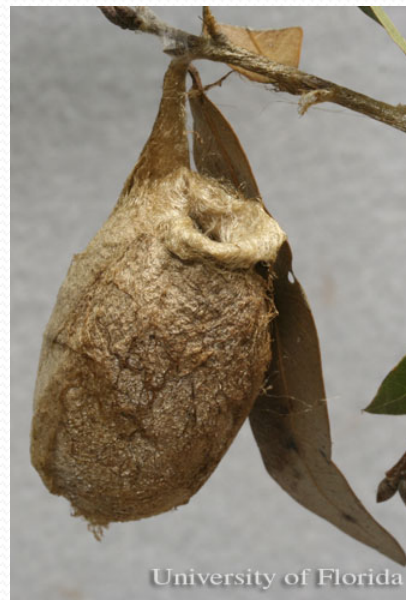


## GIANT SILK MOTHS

Most larvae with spiny or hairy tubercles.

Urticating hairs of some larvae can cause medical problems (e.g., *Hemileuca* spp).

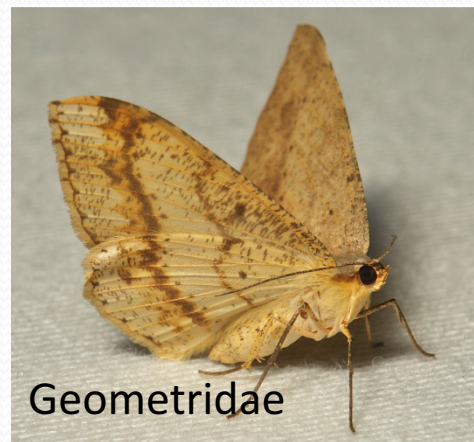
Pupae short and fat in a leathery or papery cocoon.





# Geometroidea

- Epicopeiidae (9 genera, 20 species)
- Sematuridae (6 genera, 40 species)
- Uraniidae (90 genera, 686 species)
- Geometridae (2,002 genera, 23,002 species)\*

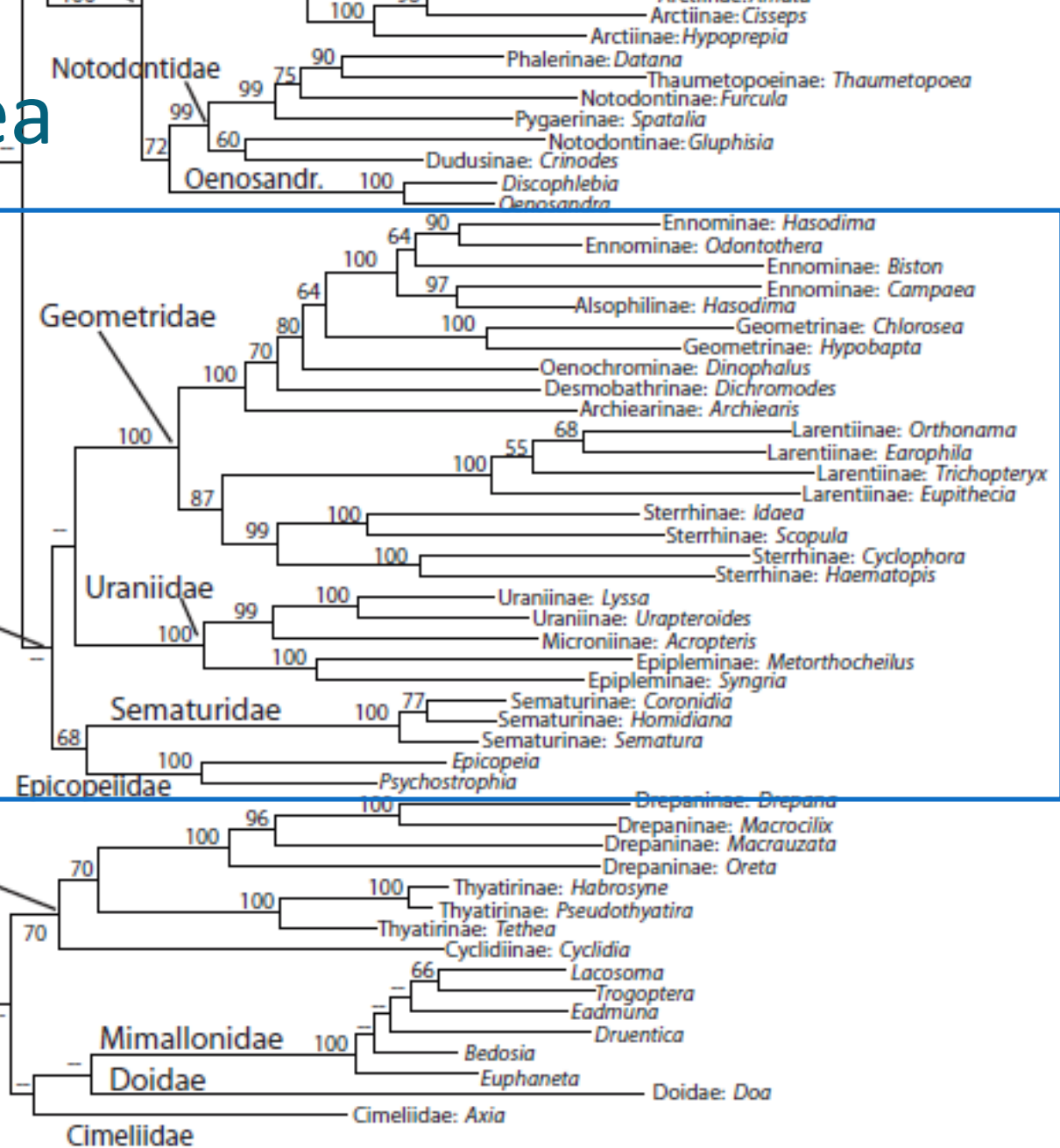


# Geometroidea

Macroheterocera

Geometroidea

Drepanidae





# Geometroidea - Geometridae

GEOMETERS, INCH WORMS, EMERALDS

Variable size – large, diverse family.

Mostly nocturnal.

Triangular forewing, with pattern frequently extending onto hindwing.

Characteristic resting postures.

Moderate long antennae, frequently plumose in male.

Characteristic abdominal tympanum (have to see in lab).



# Geometroidea - Geometridae

## GEOMETERS, INCH WORMS, EMERALDS

Foliage-feeding larvae are pests of many crops, ornamental plants, and forest trees; may defoliate entire trees under outbreak conditions.

Absence of prolegs on A3, A4, A5 result in “gap” in prolegs and responsible for characteristic gait.





# Changes since about 1980 in noctuoid families

- Noctuidae (now divided into Erebidae and Noctuidae)
- Arctiidae (now subsumed into Erebidae)
- Lymantriidae (now subsumed into Erebidae)
- Notodontidae (expanded to include Dioptidae)
- Dioptidae (now subsumed into Notodontidae)
- Nolidae (frequently included in Noctuidae)
- Euteliidae (frequently included in Noctuidae)
- Doidae (now placed in Drepanoidea)

# Noctuoidea

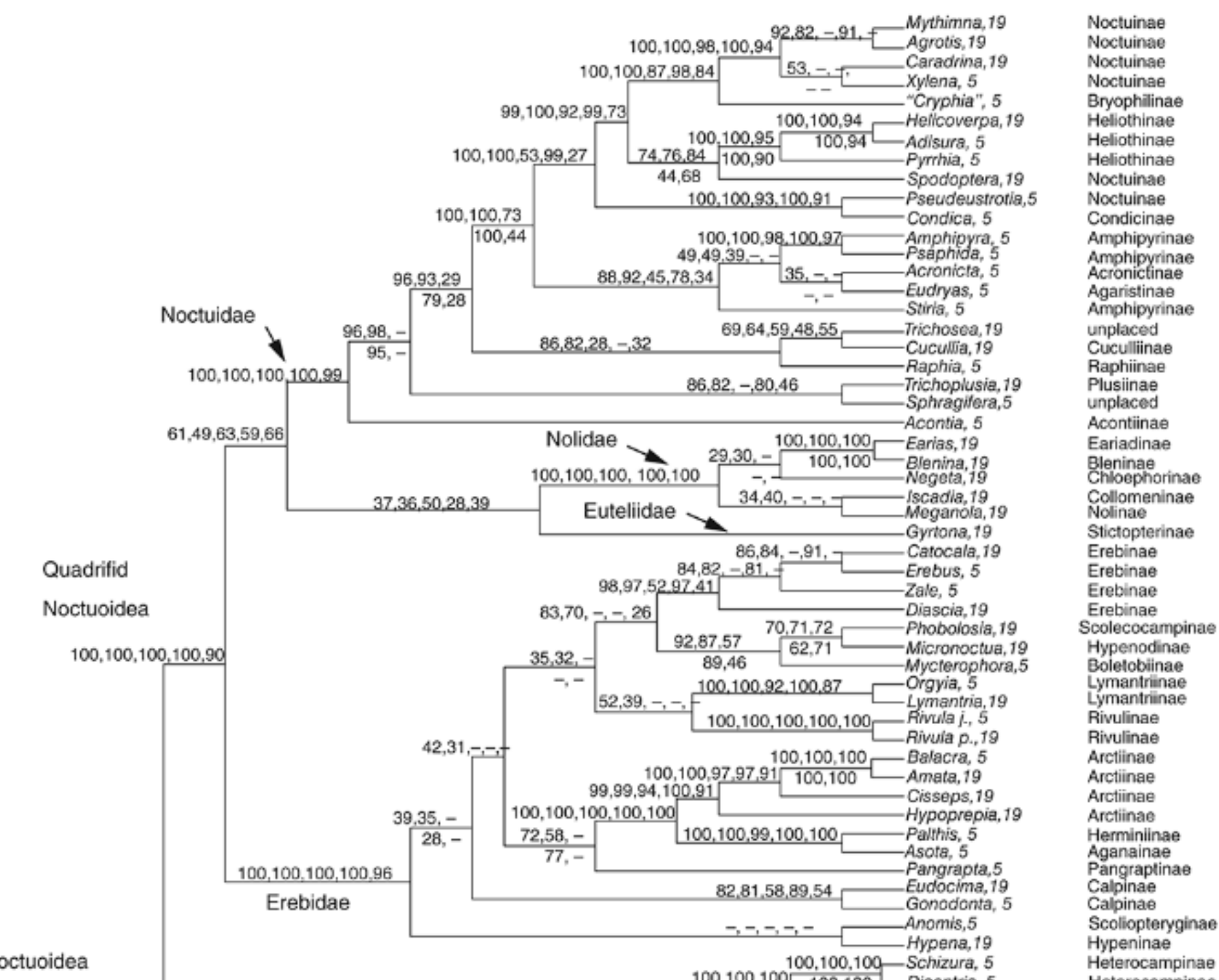
- Oenosandridae (4 genera, 8 species)
- Notodontidae (104 genera, 3,800 species)
- Erebidae (1,760 genera, 24,569 species)
- Euteliidae (29 genera, 520 species)
- Nolidae (186 genera, 1,738 species)
- Noctuidae (1,089 genera, 11,772 species)



Erebidae







# Noctuoidea

- Oenosandridae (4 genera, 8 species)
- Notodontidae (104 genera, 3,800 species)\*
- Erebidae (1,760 genera, 24,569 species)\*
- Euteliidae (29 genera, 520 species)
- Nolidae (186 genera, 1,738 species)
- Noctuidae (1,089 genera, 11,772 species)\*



Erebidae





# Noctuoidea - Notodontidae

## PROMINENTS

Medium-sized nocturnal moths.

Mouthparts reduced.

Long-triangular forewing.

Male antennae frequently plumose basally, ciliate distally.

Metathoracic tympanum.



*Datana* sp.



*Pheosia portlandia*



*Schizura* sp.

# Noctuoidea - Notodontidae

## PROMINENTS

External Foliage-feeders, but rarely considered pests.  
A10 prolegs frequently absent resulting in odd resting posture.





# Noctuoidea - Erebidae

UNDERWINGS, TIGER MOTHS, WOOLY BEARS,  
TUSSOCK MOTHS, AND OTHERS

Medium to large nocturnal moths.

Mouthparts variable.

Usually with long-triangular forewing.

Metathoracic tympanum.





# Noctuoidea - Erebidae

UNDERWINGS (formerly  
Noctuidae, in part)



TIGER MOTHS (formerly  
Arctiidae)



TUSSOCK MOTHS (formerly  
Lymantriidae)





# Noctuoidea - Noctuidae

## CUTWORMS, LOOPERS, FLOWER MOTHS, AND OTHERS

Medium to large nocturnal moths.

Mouthparts variable

Long-triangular forewing

Metathoracic tympanum



# Noctuoidea - Noctuidae

## CUTWORMS, LOOPERS, FLOWER MOTHS, AND OTHERS

Includes many economically important pests of agricultural crops (mostly vegetables) – corn earworm, beet army worm, tobacco budworm, and many others.





# If we could learn 8 families of Macrolepidoptera, that would be awesome!

- Saturniidae
- Sphingidae
- Lasiocampidae
- Geometridae
- Notodontidae
- Noctuidae
- Erebidae
- Apatelodidae



# What family?





# What family?





# What family?





# What Family?





# What family?





# What family?



# What family?





# What family?

